

CLAIMS

1. A buckling actuator comprising a substrate; a movable member disposed above the substrate and shiftable in a predetermined shifting direction; a stationary member which is disposed on the substrate and supports the movable member; a supporting beam which is connected between the stationary member and the movable member in a buckling manner and supports the movable member at one of two switch positions selectively, the two switch positions being distant from each other in the shifting direction of the movable member; and switching device for switching the position of the movable member,

wherein at least one of a connecting section between the stationary member and the supporting beam, and a connecting section between the movable member and the supporting beam is provided with a rotatable supporter including at least three arm portions extending in directions different from one another, the rotatable supporter supporting the supporting beam in a rotatable manner about an axis line extending perpendicular to the substrate.

2. The buckling actuator according to Claim 1, wherein said at least three arm portions of the rotatable supporter comprise three arm portions extending away from an end of the supporting beam to form a substantially T-shape.

3. The buckling actuator according to Claim 1, wherein said at least three arm portions of the rotatable supporter extend away from an end of the supporting beam in a radial fashion.

4. The buckling actuator according to any one of Claims 1, 2, and 3, wherein each of the connecting section between the stationary member and the supporting beam and the connecting section between the movable member and the supporting beam is provided with the rotatable

supporter, such that each end of the supporting beam is rotatably supported by the corresponding rotatable supporter.

5. The buckling actuator according to any one of Claims 1, 2, 3, and 4, wherein a midsection of the supporting beam in the longitudinal direction of the supporting beam is provided with a reinforcing portion having higher rigidity than other sections of the supporting beam.

6. The buckling actuator according to Claim 5, wherein a cross-section of the reinforcing portion is at least twice as rigid as a cross-section of each end of the supporting beam.

7. The buckling actuator according to any one of Claims 1, 2, 3, 4, 5, and 6, wherein the switching device shifts the movable member by using an electrostatic force.

8. The buckling actuator according to any one of Claims 1, 2, 3, 4, 5, and 6, wherein the switching device shifts the movable member by using a magnetic force.

9. The buckling actuator according to any one of Claims 1, 2, 3, 4, 5, 6, 7, and 8, wherein the movable member, the stationary member, the supporting beam, the rotatable supporter, and the switching device are formed of a single-crystal silicon material.

10. The buckling actuator according to any one of Claims 1, 2, 3, 4, 5, 6, 7, 8, and 9, wherein the movable member moves toward and away from an optical path provided above the substrate based on the switch positions such that the movable member defines an optical switching unit for switching the optical path, the movable member being

maintained at a corresponding one of the switch positions with a resilient force of the supporting beam.